

## NOAA SCIENTIFIC PUBLICATIONS REPORT

NOVEMBER 19 - NOVEMBER 30, 2012

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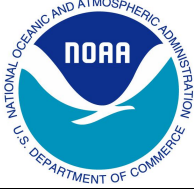
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- a. An inverse demand system for New England groundfish: welfare analysis of the transition to catch share management





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### 1. HIGHLIGHTED ARTICLES

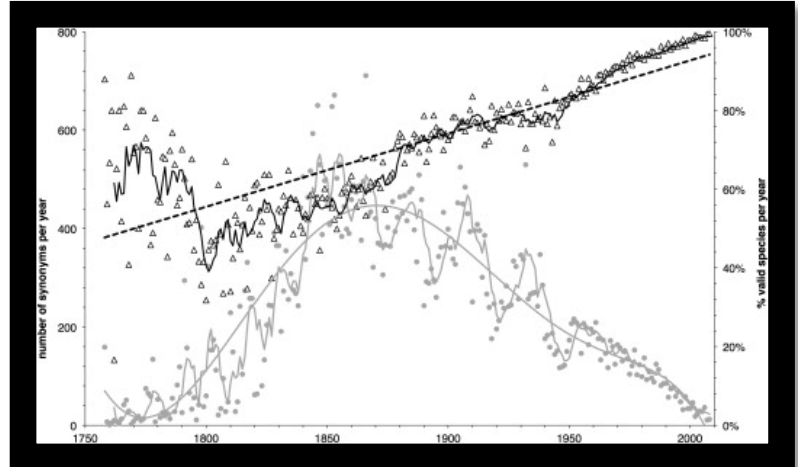
- 1a. Title: [\*The magnitude of global marine biodiversity\*](#)

**Journal:** Current Biology

**Authors:** Appeltans W et al. (100 or so authors), including NOAA authors **AG Collins** (NMFS/National Systematics Laboratory) and **WF Perrin** (NMFS/SWFSC)

**Significance:**

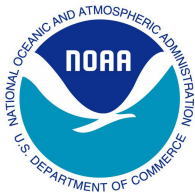
- The number of marine species is estimated to be 0.7 – 1.0 million. Previous estimates of total marine species numbering more than one million now appear highly unlikely.
- Documenting all marine species is a much more tractable goal than was previously thought, and if the current trend continues, most species will be discovered this century.
- Between one-third and two-thirds of marine species remain unknown, continued research and support can significantly improve our understanding of marine ecosystems.



**Summary:** The question of how many marine species exist is important because it provides a metric for how much we do and do not know about life in the oceans. The number of species in the sea has been surprisingly difficult to estimate, with prior estimates varying widely. We have compiled the first register of the marine species of the world and used this baseline to estimate how many more species, partitioned among all major eukaryotic groups, may yet be discovered. There are ~226,000 eukaryotic marine species described. More species were described in the past decade (~20,000) than in any previous one. We report that there are 170,000 synonyms, that 58,000–72,000 species are collected but not yet described, and that 482,000–741,000 more species have yet to be sampled. Molecular methods may add tens of thousands of cryptic species.

**Expected publication date:** December 4, 2012

**Press release:** Possible Northeast Science Spotlight



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**1b. Title:** [\*Extensive dissolution of live pteropods in the Southern Ocean\*](#)

**Journal:** Nature Geoscience

**Authors:** N. Bednarske, G.A. Tarling, D.C.E. Bakker, S. Fielding, E.M. Jones, H. J. Venables, P. Ward, A. Kuzirian, B. Leze, **Richard Feely (NOAA/PMEL)**, E.J. Murphy



**Significance:**

- The data presented in this study validate the prediction of a wide body of laboratory-based studies on the vulnerability of pteropods to the acidification of polar oceans.
- A shallow aragonite saturation depth was observed, which is at least partially the result of oceanic absorption of anthropogenic carbon dioxide, and demonstrates the impact of ocean acidification is already occurring in oceanic populations.
- The authors suggest that regional declines of pteropod populations may occur sooner than projected at present as areas of undersaturation in the Southern Ocean surface water become more widespread.

**Summary:** The carbonate chemistry of the surface ocean is rapidly changing with ocean acidification, a result of human activities. In the upper layers of the Southern Ocean, aragonite – a metastable form of calcium carbonate with rapid dissolution kinetics – may become undersaturated by 2050. This work looks at live samples of pteropods, small aragonite-shelled creatures, taken during a field study in 2008, and the effect of their being incubated in a range of conditions.

**Publication date:** December 2012

**Press release:** Press release written and distributed by lead author institution (British Antarctic Survey) with some NOAA contribution.



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- 1c. Title:** *Effects of chronic bottom fishing on the benthic epifauna and diets of demersal fishes on Northern Georges Bank*

**Journal:** Marine Ecology Progress Series

**Authors:** *Smith BE (NMFS/NEFSC), JS Collie, NL Lengyel*



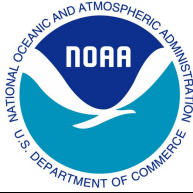
**Significance:**

- This is the first study to document a link between bottom fishing disturbance from mobile gear and demersal fish feeding on Georges Bank.
- Sustained bottom fishing in an area produces differences in epibenthic invertebrate richness, abundance, and biomass that in turn affect the diet and growth of the benthic feeding fishes examined.
- Findings support securing benthic prey populations through management actions such as area closures and promoting use of low-impact bottom fishing gears, as well as for including habitat factors in fish stock assessments.

**Summary:**

Differences in the epibenthic invertebrate and fish communities between sites with contrasting levels of disturbance from mobile bottom fishing gear for two gravel regions of Georges Bank in the northwest Atlantic were quantified. The fishes selected for diet comparisons included winter skate (*Leucoraja ocellata*), little skate (*Leucoraja erinacea*), Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), winter flounder (*Pseudopleuronectes americanus*), and longhorn sculpin (*Myoxocephalus octodecemspinosus*). Fish stomach contents differed significantly among habitats for three benthivores: winter flounder, haddock, and longhorn sculpin; diets were more highly correlated with the benthic fauna within than among sites, which indicated site-specific feeding. In several cases, prey that contributed to the diet dissimilarity between sites were benthic epifauna most sensitive to the impact of bottom fishing disturbance; thus, the availability of epibenthic prey was determined by this disturbance. This paper provides additional data that could be used in a more ecosystem-based approach to managing these resources, one in which the effects of trawling on prey species can be a factor.

**Acceptance Date:** September 5, 2012



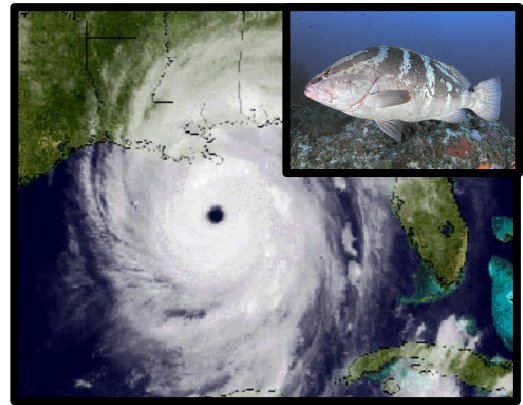
## NOAA SCIENTIFIC PUBLICATIONS REPORT

NOVEMBER 19 - NOVEMBER 30, 2012

- 1d. Title:** *Measuring the initial economic effects of hurricanes on commercial fish production: the US Gulf of Mexico grouper fishery*

**Journal:** Natural Hazards

**Authors:** Daniel Solis, **Larry Perruso**, Julio del Corral, **Brent Stoffle**, David Letson  
**\*NMFS/SEFSC/SSRG**



**Significance:**

- Hurricanes striking the Gulf of Mexico coastline from 2005 to 2009 had a negative effect on the production of the commercial grouper fleet
- SPF methodology may be useful to fishery managers when assessing economic damage to the fishing industry due to a rare event

**Summary:**

We used a stochastic production frontier (SPF) model, to estimate the economic effects of productivity losses associated with specific hurricanes on commercial grouper fishing. In addition, we calculated the economic effects due to productivity losses during an entire hurricane season at the regional level (the Gulf of Mexico). Our results revealed that hurricanes striking the Gulf of Mexico coastline from 2005 to 2009 had a negative effect on the production of the commercial grouper fleet. The results also demonstrated the relative importance of inputs and regulations on fish production. The model can be expanded to estimate economic impacts at a regional level. The measures of economic displacement produced by the SPF model are best interpreted as lower bound estimates of the true initial economic effect on commercial fishing operations caused by the storm. The SPF methodology may be useful to fishery managers when assessing economic damage to the fishing industry due to a rare event. The approach may alert managers to serious short-term economic displacement early in the process of federal disaster relief.

**Acceptance Date:** October 25, 2012

**Expected publication date:** March 2013 (will be available online earlier)



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### **2. ADDITIONAL ARTICLES**

- 2a. Title:** *Ground/satellite observations and atmospheric modeling of dust storms originated in the high Puna-Altiplano deserts (South America): Implications for the interpretation of paleo-climatic archives*

**Journal:** Journal of Geophysical Research - Atmospheres

**Authors:** D.M. Gaiero, L. Simonella, S. Gassó, S.Gili, **A.F. Stein (OAR/ARL)**, P.Sosa, R. Becchio, J. Arce and H.Marelli

**Significance:**

- Results reported here show that an important proportion of sediments from the Puna-Altiplano Plateau in South America can reach the Atlantic Ocean
- More detailed analysis of geochemistry and mineralogy of this material will help to determine its potential role in ocean fertilization and whether it reaches Antarctica

**Summary:** For southern South America, El Niño events provoke intense dry conditions over the Puna-Altiplano Plateau (PAP) and wet conditions over the lowland areas to the east. This work combined chemical and textural analyses of surface soil and dust samples, with ground observations (meteorological data), satellite images and measurements (MODIS/CALIPSO), and model simulation (HYSPLIT) to improve our understanding of the emission, transport, and deposition of eolian sediments produced in the subtropical high Puna-Altiplano deserts and emitted during dust storms. Because PAP sediments have a distinct latitudinal signature and are clearly different from the Patagonian chemical fingerprint, this could have important implications for the interpretation of paleo-records (e.g. the Argentinean loess). Moreover, the possibility of distinction between the chemical/textural signature of the northern PAP from the southern Altiplano on paleo-record archives (loess, ocean sediment cores, ice cores, etc), could have significance as a proxy to understand the equatorward/poleward displacement of the subtropical westerly jet stream during past climatic cycles.

**Expected publication date:** 2013



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**2b. Title:** *Global conservation status and research needs for tarpons (Megalopidae), ladyfishes (Elopidae), and bonefishes (Albulidae)*

**Journal:** Fish and Fisheries

**Authors:** Adams AJ, AZ Horodysky, **RS McBride (NMFS/NEFSC)**, K Guindon, J Shenker, TC MacDonald, HD Harwell, R Ward, K Carpenter

**Significance:**

- Most species of tarpons, ladyfishes, and bonefishes face significant challenges from anthropogenic habitat loss, alteration, or degradation, and several are vulnerable to overfishing.
- Catch-and-release fishing is a promising model to improve the conservation status of these fishes and the economic development of fishing communities that depend on them.

**Summary:** We reviewed taxonomic diversity, geographic distributions, life history, ecology, and fisheries of tarpon (Megalopidae), ladyfishes (Elopidae), and bonefishes (Albulidae), which share many life history and habitat use characteristics that make them vulnerable to environmental and anthropogenic stresses in coastal environments. This assessment of Red List status for the International Union for the Conservation of Nature reveals three species near threatened or vulnerable, and three species of least concern, but 11 species were deemed data deficient. Although the taxonomy of tarpons appears stable, it is less so for ladyfishes and bonefishes. These species are distributed circumtropically and foray into temperate zones. Although they spawn in marine habitats, larvae of many species disperse into estuarine habitats, which are declining in area or degrading in quality. Several species support high-value recreational fisheries, or culturally important small-scale commercial and artisanal fisheries, although no formal stock assessment exists for any species. Improved data collection, information sharing, and assessment techniques may facilitate socio-economic development of individual fisheries. Broader protection and enhancements to fisheries habitat in all regions will benefit these as well as many other coastal fishery species.

**Acceptance Date:** October 26, 2012

**Rollout Plan:** A press release by IUCN



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### **3. OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS**

- 3a. **Title:** [\*An inverse demand system for New England groundfish: welfare analysis of the transition to catch share management\*](#)

**Conference proceedings:** Agricultural and Applied Economics Association 2012

**Authors:** Lee, MY (NMFS/NEFSC) and E Thunberg (NMFS/S&T)

**Significance:**

- Catch shares mitigated loss in consumer welfare for the New England groundfish fishery as compared to days-at-sea effort control.

**Summary:** In 2010, the Northeast groundfish fishery transitioned from an effort-control system (days-at-sea) to an output-control system (catch shares). Simultaneously, a large decrease in aggregate catch was imposed in order to achieve biological objectives. This research examined the demand and supply of this fishery under the current catch share system and the days-at-sea system. Under the simultaneous management change to catch shares and reduction in aggregate catch, consumer welfare was reduced by approximately \$11M. However, retaining the days-at-sea system would have reduced consumer welfare by approximately \$37M. This ~\$26M difference can be attributed to the implementation of catch shares.

**Acceptance Date:** May 2012